WHAT IS CLAIMED IS

1.   A method for visualizing a network having a plurality of nodes, comprising:

collecting information from at least one of the nodes, the information describing network

operation over a period of time;

reconstructing the network operation for the time period from the collected information; and

presenting the reconstructed network operation to an operator.

2.   The method of claim 1, wherein the collecting includes:

obtaining at least one of node status change information, information regarding

messages received and transmitted in the network, and link status change information.

3.   The method of claim 1, wherein the collecting includes:

obtaining forwarding tables from the nodes.

4.   The method of claim 3, wherein the reconstructing includes:

creating forwarding tables from the collected information.

5.   The method of claim 4, further comprising:

comparing the forwarding tables obtained from the nodes to the created forwarding

tables; and

measuring routing protocol convergence time based on the comparison.

6. The method of claim 1, wherein the reconstructing includes:

combining information from at least two of the nodes,

sorting the combined information by time, and

reconstructing the network operation using the sorted information.

7. The method of claim 1, wherein the presenting includes:

displaying the reconstructed network operation to the operator as an interactive

~~network topology diagram.~~

8. The method of claim 7, wherein the displaying includes:

providing detailed information regarding the network operation in response to an

instruction from the operator.

9. The method of claim 8, wherein the providing includes:

displaying detailed information regarding one of a node, a link, and a message in

the network.

10. The method of claim 1, wherein the presenting includes:

displaying the reconstructed network operation to the operator, and

permitting the operator to manipulate the display.

11. The method of claim 1, wherein the presenting includes:

replaying the reconstructed network operation over the time period, and

permitting the operator to manipulate the replay operation.

12.   The method of claim 11, wherein the permitting includes:

allowing the operator to at least one of fast forward and rewind the replay

operation.

13.   A system for visualizing a network having a plurality of nodes, comprising:

means for collecting information from at least one of the nodes, the information

describing network operation over a period of time;

means for reconstructing the network operation for the time period from the collected

5   information; and

means for presenting the reconstructed network operation to an operator.

14.   A system for visualizing a network having a plurality of nodes, comprising:

a memory that stores instructions; and

a processor configured to execute the instructions in the memory to collect information

from at least one of the nodes, the information describing network operation over a period of

5   time, reconstruct the network operation for the time period from the collected information, and

present the reconstructed network operation to an operator.

15.   The system of claim 14, wherein when collecting, the processor is configured to

obtain at least one of node status change information, information regarding messages received

and transmitted in the network, and link status change information.

16.   The system of claim 14, wherein when collecting, the processor is configured to obtain forwarding tables from the nodes.

17.   The system of claim 16, wherein when reconstructing, the processor is configured to create forwarding tables from the collected information.

18.   The system of claim 17, wherein the processor is further configured to compare the forwarding tables obtained from the nodes to the created forwarding tables, and measure routing protocol convergence time based on the comparison.

19.   The system of claim 14, wherein when reconstructing, the processor is configured to combine information from at least two of the nodes, sort the combined information by time, and reconstruct the network operation using the sorted information.

20.   The system of claim 14, wherein when presenting, the processor is configured to display the reconstructed network operation to the operator as an interactive network topology diagram.

21.   The system of claim 20, wherein when displaying, the processor is configured to provide detailed information regarding the network operation in response to an instruction from the operator.

22.   The system of claim 21, wherein when providing, the processor is configured to display detailed information regarding one of a node, a link, and a message in the network.

23.   The system of claim 14, wherein when presenting, the processor is configured to display the reconstructed network operation to the operator, and permit the operator to manipulate the display.

24.   The system of claim 14, wherein when presenting, the processor is configured to replay the reconstructed network operation over the time period, and permit the operator to manipulate the replay operation.

25.   The system of claim 24, wherein when permitting, the processor is configured to allow the operator to at least one of fast forward and rewind the replay operation.

26.   A computer-readable medium that stores instructions for causing at least one processor to perform a method for visualizing a network having a plurality of nodes, the method comprising:

        collecting information from at least one of the nodes, the information describing network operation over a period of time;

        reconstructing the network operation for the time period from the collected information; and

        ~~presenting the reconstructed network operation to an operator.~~

27.   A computer-readable memory device of a node in a network containing a network

operations data structure, comprising:

a first area that stores information regarding node status changes;

a second area that stores information regarding messages received and transmitted by the

5   node; and

a third area that stores information regarding link status changes in the network.

28.   The computer-readable memory device of claim 27, wherein the node status

change information includes information regarding state changes of the node and time stamps

indicating times corresponding to the state changes.

29.   The computer-readable memory device of claim 27, wherein the message

information includes information regarding messages transmitted or received by the node and

time stamps indicating times corresponding to the transmission or reception of the messages by

the node.

30.   The computer-readable memory device of claim 27, wherein the link status

change information includes information regarding attribute changes of a link in the network and

time stamps indicating times corresponding to the attribute changes.

31.   The computer-readable memory device of claim 27, further comprising:

a fourth area that stores a forwarding table for the node.

32.   An interactive graphical user interface for visualizing a network having a plurality of nodes, comprising:

a network topology diagram configured to display at least some of the nodes, links connecting the nodes, and messages transmitted through the network; and

5   replay controls that permit an operator to control a replay sequence of the network as the network operates over a period of time.

33.   The graphical user interface of claim 32, wherein the replay controls include controls for performing at least one of a fast forward, a rewind, a step forward, and a step backward of the replay sequence.

34.   A method for visualizing a network having a plurality of nodes, comprising:

recording network events by one or more of the nodes over a period of time;

collecting the recorded events from the nodes;

recreating operation of the network over the time period from the recorded events; and

5   displaying the recreated network operation.

35.   The method of claim 34, wherein the recording includes:

generating a time stamp for each of the recorded events.

36.   The method of claim 35, wherein the recreating includes:

combining the recorded events from the nodes, and

sorting the recorded events based on the generated time stamps.